

# Particle Production by Gravitational Fields

*Wednesday, 17 May 2023 13:15 (1 minute)*

While from a classical perspective we think of vacuum as empty space, it is filled by virtual particles from a quantum perspective. In flat spacetimes, these virtual particles arise in pairs, exist for a short amount of time, and then re-annihilate. As a result, no real particles are created.

In this talk, we show that real particles are created in curved spacetimes. This is because gravitational forces suppress the probability for re-annihilation, independent of the presence of event horizons. We investigate this particle production effect for the spacetime of a static, spherically symmetric Schwarzschild black hole and compare its predictions with those from Hawking radiation.

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**Session Classification:** Poster Prizes & closing